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ABSTRACT

This paper distinguishes between basic research, applied research, and evaluation. Evaluation is broken down into two types: summative and formative. The limitations of formative research are presented, fcllowed by a discussion of the value of the formative researcher participating in the product planning process. The types cf data which formative researchers can give to development teams are indicated, alcng with the responsibilities of the development team in the formative research process. (Author/DAG)

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ACCESS ALBERTA
RESEARCH AND EVALUATION

FORMATIVE RESEARCH IN EDUCATIONAL MEDIA

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by

Timothy Hodapp

The paper begins by distinguishing between basic research, which attempts to learn new laws about the world, applied research, which attempts to relate those new laws to real-world situations, and evaluation, which provides decision-oriented information to management. Evaluation is then further broken down into two types: summative, which determines the ultimate effectiveness of a product, and formative, which provides feedback to decision-makers on product effectiveness at a time when improvement in the product can still be performed.

The limitations of formative research are presented, followed by a discussion of the value of the formative researcher participating in the product planning process. The types of data which formative researchers can give to development teams are indicated along with the responsibilities of the development team in the formative research process.

The paper concludes with a comment regarding the use of standard statistical tests of significance in formative research.

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The function of educational media is very complex. It strives through attractive and interesting presentations to teach its audience about the world we live in and the skills necessary for coping effectively in that world.

Commercial television generally performs a single function - it entertains its audience. While the techniques employed in this endeavor are many and varied, the goal of all of them remains the same: keep the audience amused or interested, and tuned in.

Although the proven techniques of commercial broadcasting are often used by producers of educational media products, the added dimension of audience enrichment precludes the assumption that these techniques enhance the learning process. Nor can the educational effectiveness of such products be determined simply by counting heads, the method employed by evaluating commercial television broadcasts.

To answer the questions regarding the effectiveness of any product, the action-oriented discipline of evaluation has emerged. Because evaluation has a judgmental function, it differs from pure, or basic research, which attempts to further human knowledge by learning new laws about the world, and applied research, which attempts to relate those new laws to real-world situations.

For many people, the word "evaluation" has a terminal connotation. That is, after use of an educational product has been completed, the researchers descend to determine whether the product has had the desired effects and/or any unplanned effects. This form of evaluation, or summative research, generally requires a measurement of user capabilities before and after deployment and use of the entire package under evaluation. The resulting change in behavior, attitude, or affect is then compared to the change exhibited by a similar, i.e., control group which did not use the product.

If the product induced considerable change in the users relative to the control group, the product is judged a success. While the report of this study may help

market the product, few statements can be made concerning the causes for that success.

If little difference is noted between user and control groups, the product is judged ineffective. The final report, in this case, merely serves as an epitaph for the project. Thus, summative research has limited utility within an organization like ACCESS.

However, evaluation also implies the process of obtaining and providing data essential for informed judgments between decision alternatives. Given the content and target audience for a potential program, the producers and program developers have a wide variety of formats available for presenting the material. However, as previously noted, the application of a proven broadcast technique does not automatically insure educational effectiveness. In fact, the very technique which attracts the audience may interfere with the educational message.

As an example, recall the segments of "Sesame Street" in which Bill Cosby introduced a number or a letter. Cosby was fantastic for gaining the attention of the viewers, but the viewers never looked at the letter or number he was describing. After this was discovered subsequent segments had Cosby alone to attract attention, followed by a letter or number presented cleanly with nothing else to distract it. Thus, one of the major functions of the Research and Evaluation Department at ACCESS is to provide program developers with information regarding ACCESS products in terms of their appeal, clarity, and educational effectiveness of ACCESS products as the products are being developed, i.e., engage in formative research.

The formative researcher can give initial outlines of programs to potential users for comment. Based on this feedback, the program may or may not be changed. Varieties of format elements may be shown to members of the target audience to determine which is most appealing and/or educationally effective. Based on this

information, program relevant decisions will be made. Pilot programs and support materials can be used with members of the target audience to determine whether the program as a whole is appealing and educationally beneficial, or what elements of the program need to be modified to make it so.

Formative research during the development of the program "Readalong", for example, took several forms. The six pilot programs were taken into several classrooms and used in a way consistent with the guidelines of the program. Student observations indicated that the program had great appeal, so no changes were instituted in this area.

However, the program developers wanted to be sure that the program was having some educational benefit. The series employed the magazine format. Even though this technique had been used so successfully on "Sesame Street" in teaching number and letter recognition, there was no guarantee that it would be effective for teaching reading. So after the six programs had been shown over a two-week period, students who saw the series were asked to read flashcards of words introduced on the program and other words of equal difficulty. The students could read substantially more of the program words than control words which indicated that "Readalong" would help students learn to read.

A variety of segments were used to introduce or reinforce words on the programs. In some, the words had to compete against other words or the characters. In order to determine whether children could read the word, eye movement studies were conducted. This is a research technique employing sophisticated machinery by which the exact location of a viewer's gaze on a television screen can be determined. The results indicated that in many cases viewers were not looking at the words because of competing elements on the screen. As a result, some segments were dropped completely, others were re-edited, and segments for future programs were written to insure clean presentation of words.

Thus, the purpose of formative research is to improve a product during development, not to approve of it after completion. Input provided by formative research builds a foundation upon which informed production decisions can be made. This will increase the effectiveness of scarce dollars by maximizing the potential for a maximum sharing rate. Formative research may also produce information about educational television which can be generalized to other programs. Thus, it is within this context that evaluation will prove not only useful, but actually necessary for an organization like ACCESS.

It should be emphasized that formative research is not necessarily appropriate for all products. The effectiveness of products which do not have guidelines for their use is determined essentially by the skill and imagination of those who use them. Since no standard context exists in which to perform an evaluation, only opinions regarding possible format adaptions and potential use can be gained from potential users.

"The Ascent of Man" might be incomprehensible to someone when seen in isolation of other aids. Yet, if viewed in conjunction with the reading of the book, introductory lectures and post-viewing discussions, or visits to museums, the program might prove very rewarding and informative. However, since no guidelines were established for use, testing in any one or a selection of possible settings would be unfair to the potential of the program and testing all possible settings would be completely impractical.

Formative research is not entirely appropriate for products which are not intended to produce growth in learning in a measurable fashion. Again, a potential audience can only be surveyed to determine the appeal of the program and its potential usefulness in an educational setting.

Because of the format, content of interviews on programs such as "Come Alive" cannot be defined in advance. Therefore, viewers can only be expected to learn what was actually discussed, not what was supposed to be discussed.

Given these criteria - that a program will have some guidelines for use and will be expected to produce growth in learning describable in behavioral terms - a formative researcher should be invited to participate in the product planning process as early in the process as possible. This point is critical for several important reasons.

First, useful information can only be gained for areas that can still be modified. Once producers and program developers have locked themselves into production decisions, formative research changes to summative research. Thus, the evaluation of "Readalong" mentioned above would have been fruitless had the appeal of the program been found to be low, but the producer's committed to the use of the various characters through contractual arrangements.

It should also be noted that formative research is inappropriate in areas in which various considerations lock the production team into certain decisions. If no funds are available for animation or puppets, they should not be evaluated as alternatives to live actors.

Second, the evaluator will attain a fuller understanding of the goals and objectives of the program if he/she participates in planning meetings. A set of objectives listed on paper do not always carry the full intent of the production team. Questions will invariably arise in the researcher which will be taken back to the production team for clarification, delaying initiation of the research.

Third, when asking for information regarding a pending decision, the production team must specify the alternatives and criteria for choosing between alternatives. If no alternatives are provided, the evaluator can only determine whether the program in question works or not. If it does not, the production team must begin again and eventually move into another evaluation phase, etc. If several alternatives are provided from the outset, the evaluator can determine how well each works and the production team can decide which to use given other considerations which may affect the decision.

If the evaluator is not provided with criteria upon which a pending decision will be concluded, irrelevant information may be collected. In the "Readalong" evaluation the program developers may have wanted to know whether puppets or animated characters should be used based on appeal. Unless the evaluator is specifically informed of this criteria he/she might research the question using educational effectiveness as the criteria, a completely different question. If a situation such as this occurs a further evaluation will have to be conducted, the decision will have to be based on what information was collected, or the developers will have to make an uninformed decision. Thus, if the evaluator is present at production meetings, he/she can make the production team aware of other potential alternatives which have proven effective in other contexts and help the team specify decision alternatives and criteria in a form translatable to a researchable question.

Fourth, if the evaluator participates in program planning, he/she can begin preparations as soon as potential problem areas arise. Several weeks are often needed to find and schedule cooperative teachers, locate equipment, and devise appropriate measures. Any lead time which can be gained will hasten the research report. Thus, the researcher's presence at program planning meetings precludes the preparation of background briefing papers or meetings when questions arise, insures the researcher's understanding about the requirements of the development team, and facilitates the fastest return of information.

Once the alternatives and criteria for a particular decision have been specified, the researcher moves into the testing situation. To be effective itself the evaluation must: test for all or a large sample of outcomes desired by the program developer, use skillfully constructed measures, and test the product under conditions closely approximating those in which the program will be used when completed. Members of the development team have a responsibility to monitor this process to insure

that data collected will be relevant to pending decisions. It should be noted that final copies of materials, e.g., support materials, need not be used during formative testing as long as the preliminary materials convey all appropriate information in a usable manner.

The researcher can provide a wide variety of data to the production team, dependent only on the requirements of the team and limited only by the imagination of the researcher. While most efforts will be centered on field testing with members of the target audience, specialized information can be obtained when necessary, e.g., expert review in the early stages of development or sophisticated information as the result of such techniques as eye movement data collection.

During field testing several types of information can be collected: pre- and post-test data to determine the extent of learning, attitude change, etc. from the product; work papers, if the testing is extended over time and the program allows for some written work, which will provide a measure of learning during the course of the product; and opinions from users regarding the clarity, appeal and educational effectiveness of the product.

The techniques used by evaluators imply the methodologies and statistical significance testing of the discipline which bore evaluation: experimental psychology. However, the issue of the application of these methodologies to and the meaning of statistical significance for formative research is very tenuous and has yet to be adequately addressed by evaluation practitioners. All information derived by such procedures should be considered by the production team, but decisions should not be based solely on such information. Because most evaluations which permit experimental-like manipulation use programs which are supplemental to regular instruction or other instructional tools, small gains which do not prove statistically significant are enough to warrant continuation of a format technique. But then again, could the small gains be attributable to chance factors as well as the effect of the program? The researcher and production team should discuss all of the

relevant data as a whole to determine its significance for the pending decision.

If the process for formative research described above is followed, then ACCESS will produce attractive, appealing products with high educational effectiveness at minimum cost.

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